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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/614,019	07/08/2003	Yo Taniguchi	520.42912X00	9504

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EXAMINER	
CHENG, JACQUELINE	
ART UNIT	**PAPER NUMBER**
3768	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/614,019	TANIGUCHI ET AL.	
	Examiner	Art Unit	
	Jacqueline Cheng	3768	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 October 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *10/17/07*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed October 17, 2007 have been fully considered but they are not persuasive. The examiner respectfully disagrees with the applicant that adding limitations of the projection and the reference projection being one-dimensional overcomes the current prior art. Although Hardy (US 6,980,846 B2) discloses the use of two-dimensional cross correlation, he just suggests that this would desirably be the method of comparison (col. 5 line 11-13). However if the projections are only in one dimension, which if the system is capable of acquiring two dimensional data, it is capable of acquiring one dimension, a one dimensional cross correlation method would then be the desirable method to use. It is true as well that Hamashima (US 5,479,537) also teaches that desirably a two-dimensional image is to be used and shows in fig. 8 a two dimensional filter. However one does not have to use a two dimensional image, in fact Hamashima teaches that differential values are calculated with repect to two subscript characters *i* and *j* of which either can be equal to 1, which would show that only one dimension is being considered (col. 6 line 35-40).

2. As to the applicants arguments that the office action alleges that hardy discloses an MRI system that acquires a reference data set of a region of interest at col. 1 line 27-33, the examiner agrees that that is not disclosed there, the examiner would like to redirect the applicant's attention to the abstract and col. 3 line 66-col. 4 line 4 which are the correct places in which the reference data sets are disclosed.

3. The examiner respectfully disagrees with the applicant that both references fail to provide any disclosure or suggestion of the similarity coefficient being scalar, and would like to point out again col. 11 line 16-26 of Hamashima which discloses that a directionality-free filter can be used in which case the similarity coefficient, in the form of a cross-correlation value, becomes a scalar value.

4. Therefore the rejection of July 17, 2007 is maintained and repeated below.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. **Claims 1-12, 20 and 21** are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 6,980,846 B2 (herein referred to as Hardy et al.) in view of US Patent No. 5,479,537 (herein referred to as Hamashima). Hardy et al. discloses a method for acquiring image data from a subject with an MRI system. It is well know to one skilled in the art at the time of the invention that an MRI system inherently comprises an RF coil for generating an RF magnetic field, a main static magnet (in which a subject is placed in) providing a static magnetic field, gradient coils (usually 3) to create magnetic field gradients and a controller to control the pulse sequences. In particular, Hardy et al. discloses an MRI system that acquires a reference data set of a region of interest, such as the motion of the heart or the heartbeat (col. 1 line 27-33), and then acquires a plurality of free-breathing data sets of this region of interest. The free-

breathing data sets are then compared with the reference data set to be used in creating an image of the region of interest (col. 1 line 60-67).

7. In one embodiment of Hardy et al. it is disclosed that the reference data set is taken during a single breath-held time period (which could be either after inhaling or after exhaling) (col. 4 line 1-3). The comparison between the reference and free-breathing images are done through cross-correlations to decide which images should be kept and which are thrown away. If the feature of interest is present in any of the free-breathing images then the cross-correlation will reveal a strong central peak, if not, then the central peak will be offset. Even though Hardy et al. does not expressly disclose setting a threshold, to determine which images to reject there has to be some sort of threshold set. The amount of this threshold could be 1/m away from the 1, m being greater than 2. Being closer to the 1.0 correlation (having a greater m value) would result in a more precise image reconstruction (col. 5 line 11-45).

8. Although this comparison is not done by using a similarity coefficient in particular, the results of the similarity coefficient and the cross-correlation are the same, the strong central peaks corresponding to the 1.0 correlations. Besides the fact that it would be obvious to use any sort of comparison method to obtain the proper images, Hamashima is an image comparison method which uses cross correlation and threshold cut off values to determine if an image matches a reference image. Although in the main embodiment Hamashima uses a 2D cross correlation/similarity coefficient, Hamashima also discloses that a directionality free, or scalar coefficient may be used (abstract, col. 6 line 10-15, col. 11 line 16-26).

9. As for the controller controlling the specific sequences claimed, a controller has control over the pulses, so therefore has control to create any sequence of pulse wanted.

10. **Claims 13-19** are rejected under 35 U.S.C. 103(a) as being unpatentable over Hardy et al. in view of Hamashima, and further in view of US Patent No. 5,668,474 (herein referred to as Heid). Hardy et al. discloses most of the invention claimed as described above as well as performing Fourier transformation to obtain reconstructions of the images (col. 1 line 27-28, col. 2 line 58-61). It would be obvious to one with ordinary skill in the art at the time of the invention to perform a Fourier transform of any data that needs to be reconstructed into an image at no matter what point in the sequence.

11. What Hardy et al. does not disclose is the alternating polarity of the pulse sequence. Heid discloses a pulse sequence in which the readout magnetic field gradient and the phase-encoding magnetic field has alternating polarities (figure 1-4, col. 1 line 47-65). It would be obvious to one with ordinary skill in the art at the time of the invention to combine Heid with Hardy et al. and Hamashima as Heid discloses a pulse sequence for use in NMRI. Any pulse sequence can be applied to an MRI system, such as the MRI system of Hardy et al.

Conclusion

12. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

13. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period

will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jacqueline Cheng whose telephone number is 571-272-5596. The examiner can normally be reached on M-F 10:00-6:30.

15. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Casler can be reached on 571-272-4956. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

16. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JC

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